POST-TRAUMATIC LIGAMENTUM FLAVUM HEMATOMA: A CASE REPORT

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We present the case of a 64-year-old female treated surgically for ligamentum flavum hematoma that caused progressive radiculopathy. Initially, she suffered from an acute onset of lower back pain. Only a history of minor back injury was discovered. She rapidly became unable to walk. Magnetic resonance imaging demonstrated an epidural mass lesion at L3 to L4 that was continuous with the left ligamentum flavum. The mass was hypointense on T1-weighted images and centrally hyperintense and marginally hypointense on T2-weighted images. The margin was well enhanced by gadopentetate dimeglumine administration. After removal of the mass, the patient's symptoms completely resolved. Before surgery, we believe accurate diagnosis of ligamentum flavum hematoma can be based on magnetic resonance imaging.

Key Words: hematoma, ligamentum flavum, magnetic resonance imaging
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To our knowledge, worldwide, there are few case reports of ligamentum flavum hematoma [1–4]. Ligamentum flavum hematoma is difficult to diagnose preoperatively, even based on magnetic resonance imaging (MRI). Not only is ligamentum flavum hematoma rare, it also has non-specific features on MRI. We present the case of a 64-year-old female patient who suffered from ligamentum flavum hematoma. It was possible to distinguish ligamentum flavum hematoma from other causes of spinal cord compression on MRI in this case.

CASE PRESENTATION

A 64-year-old female patient fell down some stairs at least 3 weeks before visiting our hospital. Initially, she did not pay any attention to it, but unfortunately, she subsequently suffered from progressive lower back pain and sciatica in the second week after the fall. Although the only history was minor back injury, she rapidly became unable to walk for 4 days. She had a history of hypertension. Neurologic examination revealed radiculopathy, especially in her left leg. Laboratory studies were within normal limits.

MRI revealed severe spinal stenosis at the L3 to L4 level caused by a mass on the left dorsal side of the spinal canal. This epidural mass was continuous with the ligamentum flavum. It was hypointense on T1-weighted images (T1WI) and centrally hyperintense and marginally hypointense on T2-weighted images (T2WI) (Figure 1). The margin was well enhanced by intravenous administration of gadopentetate dimeglumine (Gd-DTPA) (Figure 2). The preoperative diagnosis was a ligamentum flavum tear with epidural hematoma.

The patient underwent surgical exploration. A large ligamentum flavum hematoma was identified during surgery, separated from the dura mater, and completely resected. After removal of the mass, the patient's symptoms completely resolved.

DISCUSSION

In general, lower back pain is mainly due to the anterior

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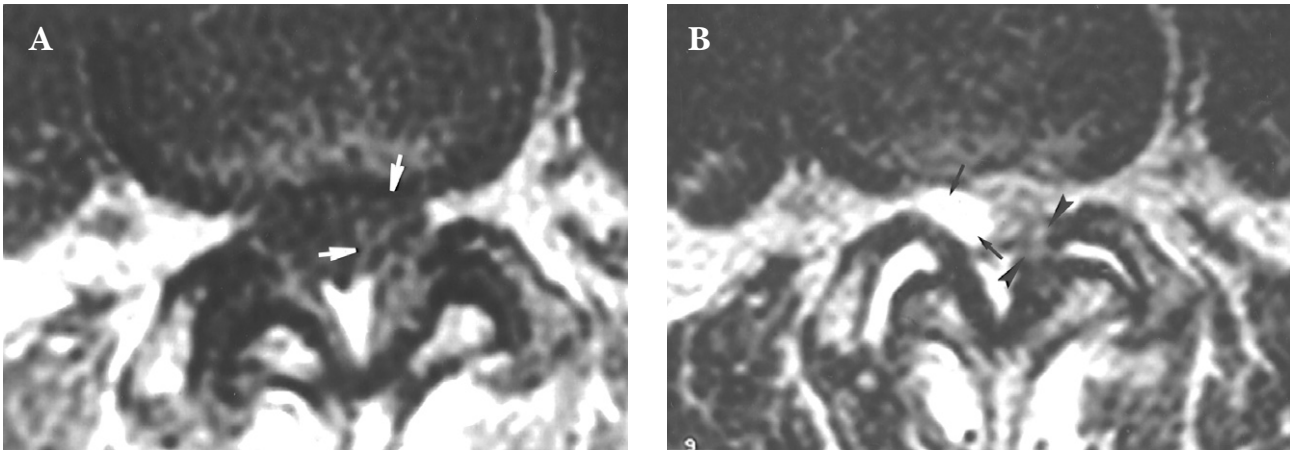

Figure 1. *(A) A hypointense mass on axial T1-weighted image (white arrows). (B) A centrally hyperintense and marginally hypointense mass on T2-weighted image. There is disruption of the left ligamentum flavum (arrowheads) and the thecal sac is displaced to the contralateral side (arrows).*

portion of the vertebrae. We rarely consider hematoma in patients with an extradural compressive lesion in the lumbar spine without a definitive history of major trauma. Hematoma from a posterior compartment such as the ligamentum flavum is even rarer, although trauma 3 months before presentation has been reported in ligamentum flavum hematoma [2].

Degeneration, hypertrophy, calcification, and ossification are common pathologies of the ligamentum flavum, whereas cysts and hematomas are rare [5,6]. Normally, the ligamentum flavum is a well-defined elastic structure because it is poorly vascularized. It is highly resistant to injury. If degeneration or hypertrophy of the ligamentum flavum has occurred, then proliferating vessels (part of the epidural venous plexus) may be susceptible to rupture after minor trauma [2,4].

All case reports of ligamentum flavum hematoma have a similar clinical picture: it occurs in older people (> 40 years) with a history of hypertension or anticoagulation or of minor trauma (mostly to the lower lumbar spine), who have a progressive clinical course over several weeks, with symptoms of spinal stenosis, epidural hematoma, or herniated disk [1–4]. Surgery produces excellent results. The clinical picture in our case had the same characteristics.

Although the ligament typically has homogeneous dark signal intensity on all the pulse sequences of MRI, not all ligament tears can be correctly identified with MRI. In our case, MRI showed a heterogeneous signal in a mass lesion arising from the discontinued ligamentum flavum on the left side. The left ligamentum flavum had unilateral and asymmetric thickening. The mass lesion was either hypo- or isointense on T1WI, with heterogeneous signal intensity on T2WI. Within the mass, areas of high signal intensity were noted. The wall of the mass was well enhanced by Gd-DTPA administration.

The differential diagnoses included spontaneous epidural hematoma, neoplasm, epidural abscess, necrotic herniated lumbar disk, ganglion, and synovial cyst. Spontaneous epidural hematoma has no preceding trauma. Its clinical course of spinal cord compression is quick and aggressive in nature. Neoplasm and epidural abscess can be ruled out by the clinical presentation. Also, epidural neoplasms rarely bleed. Necrotic herniated lumbar disks are not enhanced with contrast medium. Ganglions or

Figure 2. *On contrast-enhanced T1-weighted sagittal image, the margin of the mass (arrowheads) is enhanced by intravenous administration of gadopentetate dimeglumine.*

synovial cysts arising from the facet joint are not related to the ligamentum flavum. Following the initial injury, hematoma may show different signal intensities on MRI over time. The different signal intensities reflect the deoxyhemoglobin or methemoglobin content of the hematoma. Therefore, it can sometimes be difficult to differentiate a ligamentum flavum hematoma from an intraligamentous cyst or synovial cyst, which are also often associated with hemorrhage [7]. In particular, the MRI of a chronic hematoma may show no characteristic hemorrhagic intensity. The dark signal areas of the hematoma in our case, on both T1WI and T2WI, probably reflected not only the chronic hematoma but also organized granulation tissue. The hyperintense areas on T2WI were due to water-like space or edema.

Ligamentum flavum hematoma is very rare. In Asia, there are few reports in the literature, and these are from Japan and Turkey [1–4]. All previous cases involved males. To our knowledge, our case is the first female patient with ligamentum flavum hematoma reported in Asia. Although MRI of ligamentum flavum hematoma may vary over time following the initial injury, we recommend MRI as the single most useful investigation for this rare lesion. MRI can probably help in making an accurate and early diagnosis.

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